Nomenclatural Changes for *Zornia* (Leguminosae, Papilionoideae, Dalbergieae) in Brazil

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Abstract. While studying the species of *Zornia* J. F. Gmel. (Leguminosae, Papilionoideae, Dalbergieae) from Brazil for taxonomic revision of the genus, eight lectotypifications are proposed: *Hedysarum bifolium* Vell., *Z. diphylla* (L.) Pers. var. *bernardinensis* Chodat & Hassl., *Z. diphylla* var. *elatior* Benth., *Z. diphylla* f. *ciliata* Chodat & Hassl., *Z. myriadena* Benth., *Z. perforata* Vogel, *Z. reticulata* Sm., and *Z. sericea* Moric., as well as two neotypifications for *Z. brasiliensis* Vogel and *Z. ovata* Vogel. A new combination, *Z. vichadana* (Killip ex Mohlenbr.) Fort.-Perez & A. M. G. Azevedo is proposed, based upon *Z. pardina* Mohlenbr. var. *vichadana* Kilip ex Mohlenbr. Eighteen new synonymizations are also included.

Key words: Brazil, Dalbergieae, Leguminosae, Neotropics, Papilionoideae, *Zornia*.

The genus *Zornia* J. F. Gmel. (Leguminosae, Papilionoideae) comprises approximately 75 to 80 species from the tropics and subtropics (Mohlenbrock, 1961; Rudd, 1981; Klitgaard & Lavin, 2005). According to a recent molecular study carried out by Lavin et al. (2001), the genus is included in the informal *Adesmia* DC. clade of the tribe Dalbergieae s.l., based on DNA sequences from the chloroplast *trnK* (including *matK*) and *trnL* introns, and the nuclear ribosomal 5.8S and flanking internal transcribed spacers 1 and 2. The genus *Zornia* is morphologically characterized by a pair of peltate bracteoles similar to the stipules that surround each flower, the 2- or 4-foliolate leaves, and the stems that are normally branched and woody at the base.

The genus *Zornia* was established by Gmelin (1791) based on *Z. bracteata* J. F. Gmel. After studying this species that presents solitary flowers, Desvaux (1813) proposed a new genus, *Myriadenus* Desv., describing *M. tetraphyllus* (L.) Desv. De Candolle (1825), who published descriptions for both species in the two genera *Zornia* and *Myriadenus*, accepted this distinction. However, Vogel (1830) considered nine species of *Zornia* and, counter to Desvaux (1813), included in *Zornia* both species with solitary flowers and those with more. This treatment was later followed by Bentham (1859), Moricand (1844), and others. More than 30 species of *Zornia* were described when Bentham (1859) treated the genus for Martius's *Flora Brasiliensis*, where only eight species were accepted, divided between the two sections *Zornia* sect. *Myriadenus* (Desv.) Benth., and *Zornia* sect. *Zornia*. Bentham (1859) synonymized various species with *Z. diphylla* (L.) Pers. and established 14 infraspecific taxa within this species. The most recent monograph for the genus was done by Mohlenbrock (1961), who recognized two infragenera as *Zornia* subg. *Myriadena* (Desv.) Mohlenbr. and *Zornia* subg. *Zornia*, differentiated by their floral morphology, with the flowers solitary and pedicellate, or sessile to subsessile in inflorescences, and by the number of leaflets per leaf as four, or two or four, respectively.

During the revision of *Zornia* for Brazil by Fortuna-Perez (2009), more than 3000 accessions were analyzed through visits to European and Brazilian herbaria and loans from elsewhere, including AHUC, B, BHCB, BM, BR, CEN, CEPEC, CGMS, CTES, ESA, F, FHO, G, GH, H, HRCB, HST, HUEFS, IAC, IAN, IBGE, ICN, INPA, INTA, IPA, K, LIL, M, MBM, MEXU, MG, MICH, MO, MVM, NY, OXF, P, PACA, PAMG, PEUFR, RB, S, SI, SP, SPF, UB, UEC, US, W, Y, and Z. As part of this revision, 36 species were recognized, eight names have been found to be in need of lectotypification, and 18 names are proposed as new synonyms. Two neotypes are designated because the holotype was destroyed or lost and there are no known isotypes, and one new combination is proposed.

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LECTOTYPIFICATIONS, SYNONYMIZATIONS, AND NEOTYPIFICATIONS

Zornia J. F. Gmel., Syst. Nat., ed. 13 [bis] 2(2): 1076, 1096. 1791 [1792], non *Zornia* Moench, Methodus 410. 1794, nom. illeg. superfl. TYPE: *Zornia bracteata* J. F. Gmel.

Myriadenus Desv., J. Bot. Agric. 1: 121. 1813. TYPE: *Myriadenus tetraphyllus* (L.) Desv.

1. Zornia brasiliensis Vogel, Linnaea 12: 62–63. 1838, as "*Brasiliensis.*" TYPE: Brazil. Espírito Santo, Colatina, 28 Jan. 1997, *M. M. Arbo. et al. 7767* (neotype, designated here, NY).

Zornia brasiliensis Vogel var. *adenocarpa* L. P. Queiroz, Bol. Bot. Univ. São Paulo 16: 108–109. 1997, syn. nov. TYPE: Brazil. Minas Gerais: Grão-Mogol, 10 Dec. 1989, *P. T. Sano et al. 12384* (holotype, SPF; isotype, HUEFS, K).

Notes. When Vogel (1838: 63) described *Zornia brasiliensis*, he cited the collection *Sellow s.n.* (Brazil. "inter Campos et Victoria," s.d.), which was deposited at the Berlin Herbarium. Because none of Sellow's material has been found that corresponded to *Z. brasiliensis*, the type collection is presumed destroyed and a neotype is proposed for the name here. The locality of the original type collection corresponds to the Vale do Rio Doce region, located mainly in Espírito Santo state. The collection designated as neotype, *Arbo et al. 7767*, was collected in the Vale do Rio Doce region and is deposited at NY. The chosen specimen is characterized by the obovate leaflets that are cuneate at the base; the absence of auricles at the bracteoles; the asymmetrical bracteoles; the pubescent articles of the loment that lack reticulation, and the loment similar to those in *Desmodium*. These morphological aspects of the specimen confirm the neotype as representative of *Z. brasiliensis*.

Queiroz (1997) designated a new variety for *Zornia brasiliensis* (*Z. brasiliensis* var. *adenocarpa*), justifying this variety as different based on the loments with glands. However, our comprehensive study revealed that this characteristic occurred throughout the species, varying only in the number of the glands.

2. Zornia burkartii Vanni, Bonplandia (Corrientes) 5(20): 175. 1981. TYPE: Argentina. Corrientes: Ituzaingó, Playadito, 24 Sep. 1974, *A. Krapovickas et al. 26354* (holotype, CTES).

Zornia reticulata Sm. var. *glabra* Vogel, Linnaea 12: 58. 1838, syn. nov. TYPE: Brazil. 1841, *F. Sellow s.n.* (holotype, K).

Zornia reticulata Sm. var. *elongata* Vogel, Linnaea 12: 58. 1838, syn. nov. TYPE: Brazil. 1841, *F. Sellow s.n.* (holotype, K).

Notes. Mohlenbrock (1961) synonymized *Zornia reticulata* var. *glabra* Vogel and *Z. reticulata* var. *elongata* Vogel with *Z. reticulata* Sm., without further explanation. Our analysis of the type material clearly indicated that Vogel's two varieties correspond to variation accepted for the species *Z. burkartii*, since they have caducous leaves and an erect habit.

Bentham (1859) synonymized *Zornia reticulata* var. *glabra* to *Z. diphylla*, but *Z. diphylla* is characterized by loments with four articles, and by the articles 4.5–5 × 3.5–4 mm, without reticulation, glabrous, glandular, with numerous bristles 1.5–3.5 mm long. *Zornia burkartii* differs in having loments with four to seven articles, and by the articles 2–3 × 1.8–2 mm, reticulate, pubescent, eglandular, with bristles 0.5–1.5 mm long.

3. Zornia cryptantha Arechav., Anales Mus. Nac. Montevideo 3: 358. 1901. TYPE: Uruguay. Tacuarembó, s.d., *P. Pintos s.n.* (holotype, MVM 5362).

Zornia cryptantha Arechav. var. *latibracteata* Vanni, Bonplandia (Corrientes) 5: 180–181. 1981, syn. nov. TYPE: Argentina. Corrientes: Dep. Lavalle, 3 km de Yataity Calle, Rt. 120, 25 Nov. 1979, *A. Schinini, R. Vanni & G. Normann 19140* (holotype, CTES).

Notes. Vanni (1981) designated the variety *latibracteata* within *Zornia cryptantha*, justifying that it differed from the typical variety based on its wider bracteoles (7–11 mm wide vs. 7–10 mm wide in *Z. cryptantha*), oval bracteoles (vs. oval to oval-lanceolate in *Z. cryptantha*), and the upper leaflets (30–)39 mm long (vs. 22–42 mm long in *Z. cryptantha*). Our analysis of the type material clearly indicates that this variety corresponds to variation accepted for the species *Z. cryptantha*.

4. Zornia curvata Mohlenbr., Webbia 16(1): 132, figs. 62, 91. 1961. TYPE: Venezuela. Cotiza, near Caracas, 8 July 1917, *H. F. Pittier 7241* (holotype, US; isotype, GH not seen).

Zornia gavilanesii Brandão & Sousa Costa, Daphne 1(1): 5. 1990, syn. nov. TYPE: Brazil. Minas Gerais: Pouso Alegre, 5 Nov. 1984, *M. Brandão 10923* (holotype, RB; isotype, PAMG).

Zornia amaralaensis Brandão, Daphne 4(3): 5. 1994, syn. nov. TYPE: Brazil. Minas Gerais: Carneirinhos, 7 May 1975, *M. Brandão 906* (holotype, PAMG).

Notes. Our analysis of the type material for the two species *Zornia amaralaensis* and *Z. gavilanesii* published by Brandão (1994; Brandão & Sousa

Costa, 1990) verified that the observed morphological variations do not justify the separate recognition of these names at species rank, and therefore they are synonymized with *Z. curvata* here. Brandão and Sousa Costa (1990) differentiated *Z. gavilanesii* from *Z. curvata* by the stipule and bracteoles (cited as bracts by authors) that are bipartite and 6- to 8-nerved. According to Brandão (1994), *Z. amaralaensis* was previously included in *Zornia* subg. *Zornia* sect. *Isophylla* Mohlenbr. based on the upper and lower leaflets that are similar in shape; however, our analysis of the type material revealed a greater variability in leaflet shape.

5. Zornia echinocarpa (Moric. ex Meisn.) Benth., Fl. Bras. (Martius) 15(1): 85. 1859. Basionym: *Myriadenus echinocarpus* Moric. ex Meisn., Pl. Vasc. Gen. [Meisner] 3: 64(69–104, Tab. Diagn.). 1837. TYPE: Brazil. Bahia: s.d., *J. S. Blanchet 1682* (holotype, G).

Notes. In his revision of the genus, Mohlenbrock (1961) cited the material of *Blanchet 3842* (Jacobina, Bahia) as the type of *Zornia echinocarpa*; however, the type collection cited by Meisner (1837) does not include this material. The holotype collection mentioned by Meisner (1837) is *Blanchet 1682* and is deposited in the herbarium at G.

6. Zornia glabra Desv., Mém. Soc. Linn. Paris 4: 325. 1826. TYPE: Brazil. s.d., *P. A. M. Lavalleé s.n.* (holotype, P; isotype, F).

Zornia perforata Vogel, Linnaea 12: 59. 1838. *Zornia diphylla* var. *perforata* (Vogel) Kuntze, Revis. Gen. Pl. 3(3): 74. 1898. TYPE: Brazil. Bahia: s.d., *B. Luschnath s.n.* (lectotype, designated here, P).

Zornia diphylla (L.) Pers. var. *elatior* Benth., Fl. Bras. (Martius) 15(1): 81. 1859, non *Zornia diphylla* var. *elatior* Micheli, Bull. Herb. Boisser 6, App. 1: 33. 1898, nom. illeg. TYPE: Brazil. Bahia: Ilhéus, s.d., *B. Luschnath 401* (lectotype, designated here, BM; duplicates, G, K, NY, W)

Notes. Vogel (1838) cited two collections as the type of *Zornia perforata*, *Sellow s.n.* and *Luschnath s.n.* While visiting European herbaria, the first author found Luschnath's collection from Brazil in the Paris Herbarium. This material is complete and agrees with Vogel's original description; we therefore designate *Luschnath s.n.* as lectotype here.

Bentham (1859) considered *Zornia perforata* Vogel as a synonym of *Z. diphylla* var. *elatior*. In fact, both are morphologically identical with *Z. glabra*, and these taxa are treated as synonyms here. Bentham (1859) cited two collections of Luschnath (*401* and *1115*) as the type of *Z. diphylla* var. *elatior*. The first author analyzed both collections in different herbaria, and the material *Luschnath 401* that is deposited in K presents all characters described in the protologue and is designated as lectotype here.

7. Zornia latifolia Sm., Cycl. (Rees) 39: 206. 1819, non *Zornia latifolia* DC., Prodr. (DC.) 2: 317. 1825. TYPE: French Guiana. Cayenne, s.d., *J. B. C. F. Aublet s.n.* (holotype, P; isotype, BM).

Zornia gemella Willd. ex Vogel, Linnaea 12: 61. 1838, syn. nov. *Hedysarum gemellum* Willd. ex Vogel, nom. nud. TYPE: Brazil. s.d., "Habitat in Brasilia," *Sched. Willdenow Herb. 13778* (holotype, B-W).

Zornia gracilis DC., Prodr. (DC.) 2: 316. 1825, non *Zornia gracilis* Harms, Bot. Jahrb. Syst. 42(2–3): 212. 1908. *Zornia diphylla* var. *gracilis* (DC.) Benth., Fl. Bras. (Martius) 15(1): 83. 1859. TYPE: Guyana. 1821, *G. S. Perrottet 18* (holotype, G).

Zornia diphylla (L.) Pers. var. *bernardinensis* Chodat & Hassl., Bull. Herb. Boissier, ser. 2, 4: 888. 1904, syn. nov. *Zornia latifolia* Sm. var. *bernardinensis* (Chodat & Hassl.) Mohlenbr., Webbia 16(1): 128. 1961. TYPE: Paraguay. "Paraguay in campo San Bernardino," s.d., *E. Hassler 3502* (lectotype, designated here, G; duplicates, BM, W).

Zornia maranhamensis G. Don, Gen. Hist. 2: 280. 1832, syn. nov. TYPE: Brasil. Maranhão, s.d., *G. Don s.n.* (holotype, BR).

Zornia surinamensis Miq., Ann. Mag. Nat. Hist. 11: 14. 1843. TYPE: Suriname. "Surinam, locis elevatioribus," s.d., *s. coll.* (holotype, BR).

Notes. Smith (1819) described *Zornia latifolia* based on Aublet's collections from French Guiana (1775: 774) and cited *Hedysarum diphyllum* L. in synonymy. In his treatment of *Zornia*, Mohlenbrock (1961) did not refer to any type material for *Z. latifolia*, and synonymized *Z. gracilis* to *Z. latifolia*. Later, Sciamarelli and Tozzi (1996) cited the material *Perrottet 18* as the type of *Z. latifolia*, but this material refers to the taxon *Z. gracilis*. In our study of the collections at P, we located Aublet's material (Aublet, 1775), which Smith cited as type in his original description of *Z. latifolia*, and have properly cited the holotype here.

Through examination of the type of *Zornia gemella*, it was possible to confirm the species as *Z. latifolia*. When Vogel (1838: 61) described the species *Z. gemella*, he based it on Brazilian material that Willdenow identified as *Hedysarum gemellum* Willd. ex Vogel (an invalid name), citing the collections of *Sieber s.n.* (Pará, Brazil) and *Luschnath s.n.* (Bahia, Brazil). In the same work, Vogel (1838) described the new species *Z. ovata* Vogel, *Z. perforata*, *Z. trachycarpa* Vogel, and *Z. brasiliensis*. In all of these, he put the letter *n* after the species name, to identify the taxa as a new species. In relation to *Z. gemella*, Vogel (1838: 61) cited a collection of Willdenow (*H. gemellum* Willd. ex

Vogel) with the number 13777 (which was typed erroneously by him). The collection B-W 13777 deposited at Berlin (Willdenow Herbarium) corresponds to *H. conjugatum* Willd. The correct number of *H. gemellum* deposited at B (Willdenow Herbarium) is B-W 13778, and this is properly cited as the holotype of *Z. gemella* here.

Mohlenbrock (1961) did not observe the type collection of *Zornia gemella* and accepted it as distinct from *Z. latifolia*. Moreover, he described the new species *Z. curvata* Mohlenbr., which differed from his concept for *Z. gemella* on the basis of its curved loments.

Mohlenbrock (1961) recognized the variety *Zornia latifolia* var. *bernardinensis* (Chodat & Hassl.) Mohlenbr., distinguishing it from the typical variety by the upper leaflets being ovate (vs. lanceolate in *Z. latifolia* var. *latifolia*), punctate, 3- or multi-nerved (vs. 1- to 2-nerved), and generally glabrous on one or both faces (vs. indumented on both faces), as well as by the punctate bracts. However, these characteristics are not consistent, since *Z. latifolia* presents similar characteristics. The variation observed in *Z. latifolia* does not justify the maintenance of the variety *bernardinensis*, and the varietal name is synonymized here.

In their original description of *Zornia diphylla* var. *bernardinensis*, Chodat and Hassler (1904) cited two collections as type (*Hassler 3502* and *6035*), and lectotypification is needed. We have chosen the collection *Hassler 3502* as lectotype because it is the first material cited by Chodat in the protologue and it corresponds with the original description.

The name *Zornia maranhamensis* G. Don was considered by Mohlenbrock (1961) as a synonym of *Z. reticulata*. However, our observations of the type material support this as affiliated with *Z. latifolia*, based on its linear bracteoles that lack auricles as seen in *Z. latifolia*.

8. Zornia multinervosa Burkart ex Bacigalupo, Darwiniana 21(1): 174–176. 1977 [1978]. TYPE: Argentina. Entre Ríos: Federación, 14 Dec. 1974, *A. Burkart et al. 30855* (holotype, SI; isotype, CTES).

Zornia reticulata Sm. var. *neurada* Vogel, Linnaea 12: 58. 1838, syn. nov. TYPE: Brazil. s.d, *F. Sellow s.n.* (holotype, K).

Notes. Mohlenbrock (1961) did not treat the taxon *Zornia reticulata* var. *neurada* Vogel in his work. However, our analysis of the type material clearly indicates that the variety corresponds to *Z. multinervosa*, since the variety had the calyces with 38 or more nerves, and the name is synonymized here.

9. Zornia myriadena Benth., Fl. Bras. (Martius) 15(1): 85. 1859. TYPE: Brazil. Bahia, s.d., *Martius s.n.* (lectotype, designated here, M).

Notes. Mohlenbrock (1961) erroneously cited material from Jamaica (*Desvaux s.n.*) for the type of *Zornia myriadena*. However, Bentham (1859: 85) cited several syntypes from collections attributed to Martius, Luschnath, Blanchet (*897*, the only numbered collection mentioned), Saint-Hilaire, and Salzmann, and further noted "nec in Jamaica." Analyzing this group, the collection *Martius s.n.* most closely resembles the original description and is selected here as lectotype. This material presents all characters described in the protologue, such as the solitary flower and the leaflets obovate to elliptic with a retuse apex. *Martius s.n.* is from the first type locality mentioned by Bentham, "[h]abitat prope Bahiam in ruderatis ad vias," and is the first of four syntypes noted from Bahia.

10. Zornia reticulata Sm., Cycl. (Rees) 39: 205. 1818. TYPE: Jamaica. s.d., *D. J. Browne s.n.* (lectotype, designated here, LINN 921.23).

Hedysarum bifolium Vell., Fl. Flumin. 318. 1825 [1829], syn. nov. TYPE: Brazil. "Habitat inter gramina pascuis Regii Praedii Sanctae Crucis" [Vellozo, 1827: tab. 147] (lectotype, designated here, tab. 147 in Vellozo, 1827 [1831]).

Zornia diphylla (L.) Pers. subsp. *cuyabensis* Malme, Ark. Bot. 23A(13): 75. 1931. TYPE: Brazil. Mato Grosso: Cuiabá, 23 Nov. 1902, *G. O. A. Malme 2611a* (holotype, S).

Zornia diphylla (L.) Pers. subsp. *subperforata* Malme, Ark. Bot. 23A(13): 26. 1931. TYPE: Brazil. Rio Grande do Sul, Nov. 1901, *G. O. A. Malme 114a* (holotype, S).

Zornia diphylla (L.) Pers. f. *intermedia* Chodat & Hassl., Bull. Herb. Boissier, ser. 2, 4: 888. 1904. TYPE: Paraguay, Dec. 1898–1899, *E. Hassler 5912* (holotype, G; isotypes, BM, K, P).

Zornia diphylla (L.) Pers. var. *paraguariensis* Chodat & Hassl., Bull. Herb. Boissier, ser. 2, 4: 887. 1904. TYPE: Paraguay, 1898–1899, *E. Hassler 5115* (holotype, G; isotypes, BM, F, K, W).

Zornia diphylla (L.) Pers. f. *ciliata* Chodat & Hassl., Bull. Herb. Boissier, ser. 2, 4: 887. 1904. TYPE: Paraguay. "In campo pr. lacus Ypacaray," Dec., *E. Hassler 3700* (lectotype, designated here, G; duplicates, BM, F, K, W).

Zornia diphylla (L.) Pers. var. *rupestris* Chodat & Hassl., Bull. Herb. Boissier, ser. 2, 4: 888. 1904. TYPE: Brazil. 1900, *E. Hassler 6453* (holotype, G; isotypes, BM, P, W).

Zornia diphylla (L.) Pers. f. *diversifolia* Chodat & Hassl., Bull. Herb. Boissier, ser. 2, 4: 887. 1904, syn. nov. TYPE: Paraguay. Nov. 1898–1899, *E. Hassler 3449* (holotype, G; isotype, BM).

Zornia ovata Vogel, Linnaea 12: 58. 1838, syn. nov. TYPE: Brazil. Minas Gerais: Datas, 28 Oct. 2006, *A. P. Fortuna-Perez et al. 125* (neotype, designated here, UEC).

Zornia diphylla (L.) Pers. var. *pubescens* (Kunth) Benth., Fl. Bras. (Martius) 15(1): 82. 1859, syn. nov. Basionym: *Zornia pubescens* Kunth, Nov. Gen. Sp. (quarto ed.) 6: 515. 1823. TYPE: Colombia. Fusagasuga, s.d., *A. J. A. Bonpland & F. W. H. A. von Humboldt s.n.* (holotype, B, B-W 13775).

Zornia reticulata Sm. var. *punctata* Vogel, Linnaea 12: 58. 1838, syn. nov. TYPE: Brazil. s.d., *F. Sellow s.n.* (holotype, K).

Notes. When Smith (1818: 205) described *Zornia reticulata*, he stated "Our specimens are from Browne himself," and he cited the following collection: "*Hedysarum diphyllum* β; Willd. Sp. Pl. v. 3. 1178. δ; Lamarck v. 6.404. *H. diphyllum*; Swartz Obl. 285. H. n. Browne Jam. 301, excluding the synonyms. *H.* minus *diphyllum*, floreo luteo; Sloane Jam. v. 1. 185." According to Dandy and Milne-Redhead (1963), Smith (1818) possessed the Linnaean Herbarium, which contained Patrick Browne's plants purchased by Linnaeus in 1758. The sheet 921.23 that is deposited in the LINN Herbarium was annotated by Smith as "*Zornia reticulata* Sm. in Rees's Cyclop. [β] Willd." and annotated by Linneaus as "*Hedysarum diphyllum.*" However, in his treatment, Mohlenbrock (1961) mistakenly established a neotype (*Harris 12070* [US], from Jamaica), most likely because he did not find any material of the type collection.

Dandy and Milne-Redhead (1963) also cited LINN 921.23 as the type of *Zornia reticulata*. However, as Smith (1819) cited various collections, the sheet 921.23 in the LINN Herbarium is being designated here as lectotype.

Five species are newly synonymized here with *Zornia reticulata*: *Z. diphylla* var. *pubescens* and *Z. ovata*, which were treated by Mohlenbrock (1961) as synonymous with *Z. latifolia* and *Z. sericea* Moric., respectively; *Z. reticulata* var. *punctata*; *Z. diphylla* f. *diversifolia*; and *Hedysarum bifolium*, which was described by Vellozo (1825). When Mohlenbrock (1961) considered the taxa *Z. diphylla* var. *pubescens* and *Z. pubescens* as synonyms of *Z. latifolia*, his explanation was limited to "*Z. pubescens* is merely an exceptionally hairy form of *Z. latifolia.*" However, our observations of the type material of *Z. diphylla* var. *pubescens* support this taxon as affiliated with *Z. reticulata* based on the lanceolate to elliptic-lanceolate (to oval-lanceolate) bracteoles seen in *Z. reticulata*, while *Z. latifolia* has linear bracteoles.

When Vogel (1838: 58) described *Zornia ovata*, he mentioned that it was between *Z. reticulata* and *Z. perforata* (synonymous with *Z. glabra*). The original description of *Z. ovata* really represents a morphological variation found in *Z. reticulata*, differing widely from *Z. sericea*.

Because none of Sellow's material that corresponded to *Zornia ovata* has been located, the type (Brazil. "Hab. in Bras. merid.," s.d., *F. Sellow s.n.*), which was deposited at B, is presumed destroyed and a neotype is proposed for the name here. The chosen material (Fortuna-Perez et al., 125, UEC) was collected in Minas Gerais and presents morphological aspects that are representative of *Z. ovata*.

In relation to *Hedysarum bifolium* Vell., the correct procedure is to lectotypify the plate from the later companion series *Florae Fluminensis Icones*, which was issued after the text of *Florae Fluminensis*. There are no specimens extant that can be linked to a type for this Vellozo name, and indeed for many names in *Florae Fluminensis*. It can be assumed that the plate is the surviving indication of the original describing author's intent (McNeill et al., 2006: Art. 9.10). The original description of *H. bifolium* in *Florae Fluminensis* gives a precise locality for the type, but the plate was likely based on a collection that was lost some time ago. The plate and that lost specimen would be considered syntypes, and therefore lectotypification fixes the application of the name, as opposed to an alternate interpretation that the plate should serve as the holotype.

When Chodat and Hassler (1904) described *Zornia diphylla* f. *ciliata* (*Z. diphylla* var. *paraguariensis* f. *ciliata*), they cited three of Hassler's collections (*8176*, *5693*, and *3700*). We have chosen to lectotypify the collection *3700* because this material is complete and agrees with the original description of the taxon. In the same work, Chodat and Hassler (1904) described *Z. diphylla* f. *diversifolia* (*Z. diphylla* var. *stricta* f. *diversifolia*), and in this study, we consider it to be a synonym of *Z. reticulata*.

11. Zornia sericea Moric., Pl. Nouv. Amer. 126–127. 1844. TYPE: Brazil. Bahia: Jacobina, s.d., *J. S. Blanchet 2690* (lectotype, designated here, G; duplicates, BM, K, NY, P, W).

Notes. Vanni (1995) did not accept the name *Zornia sericea* Moric. because it is a name a posteriori of *Z. ovata* Vogel (Vogel, 1838). However, in this study, *Z. ovata* is considered a synonym of *Z. reticulata* and, therefore, excluded from circumscription of *Z. sericea*, which is reestablished here. *Zornia sericea* differs from *Z. reticulata* in its ovate bracteoles (vs. lanceolate), the length of the auricles at the bracteole (0–3 mm vs. 6–10 mm), three to four

articles per loment (vs. five to 10), and the articles 3–4 mm long (vs. 1.5–2.5 mm).

In his original description of *Zornia sericea*, Moricand (1844) cited the collections *Blanchet 2690* and *Blanchet 3873*. In his treatment of *Zornia*, Mohlenbrock (1961) cited *Blanchet 2690* as neotype. However, the correct procedure would be the lectotypification of one of these syntypes, and we have therefore designated a lectotype here. The collection *Blanchet 2690* is complete, has both flowers and fruits, and the habit corresponds to the original description and the plate.

12. Zornia trachycarpa Vogel, Linnaea 12: 60. 1838. *Zornia diphylla* var. *trachycarpa* (Vogel) Benth., Fl. Bras. (Martius) 15(1): 82. 1859. TYPE: Brazil. "In Brasil. merid.," s.d., *F. Sellow s.n.* (holotype, K).

Zornia linearifoliolata N. F. Mattos, Loefgrenia 90: 1. 1986, syn. nov. TYPE: Brazil. Rio Grande do Sul: Viamão, 22 Feb. 1984, *S. T. S. Miotto, M. Sobral & J. Waechter 938* (holotype, ICN).

Notes. *Zornia linearifoliolata* was described as different from *Z. trachycarpa*, distinguished by its upper leaflets linear, 15–25 mm long (vs. leaflets linear to lanceolate, 12–65 mm long in *Z. trachycarpa*). However, *Z. trachycarpa* includes these characteristics. Our analysis of the type material confirmed that this species is, in fact, *Z. trachycarpa*.

13. Zornia villosa (Malme) Herter, Revista Sudamer. Bot. 7: 210. 1943. Basionym: *Zornia latifolia* var. *villosa* Malme, Ark. Bot. 23A(13): 24, fig. 2. 1931. TYPE: Argentina. Misiones: Posadas, Bonpland, 11 Jan. 1908, *E. L. Ekman 1700* (holotype, NY; isotype, S).

Zornia vestita Mohlenbr., Webbia 16(1): 97. 1961, syn. nov. TYPE: Brazil. São Paulo: Itirapina, 22 Jan. 1951, *G. A. Black 51-11117* (holotype, IAN).

Notes. Mohlenbrock (1961) proposed that the name established by Herter (1943), *Zornia villosa* (Malme) Herter, taxonomically represented *Z. lanata*. The epithet for *Z. villosa* had been previously used by Glaziou (1906) to designate another species, which is treated herein as *Z. glaziovii* Harms. However, Glaziou's *Z. villosa* was a nomen nudum and was not validly published (McNeill et al., 2006: Rec. 50B.1). The binomial *Z. villosa* remains available and is recognized here; the name *Z. lanata* Mohlenbr. was not nomenclaturally necessary and should be rejected.

Zornia vestita is very similar morphologically to *Z. villosa* and has sympatric distribution. Our analysis of the type material clearly indicates that *Z. vestita* corresponds to variation accepted for *Z. villosa*.

14. Zornia virgata Moric., Pl. Nouv. Amer. 131–132. 1844. TYPE: Brazil. s.d., *M. Gardner s.n.* (holotype, G).

Zornia paniculata N. F. Mattos, Loefgrenia 63: 1. 1975. TYPE: Brazil. São Paulo: Luiz Antônio, Oct. 1967, *M. Kuhlmann s.n.* (holotype, SP 115685).

Zornia virgata Moric. var. *major* Hoehne, Exped. Roosevelt-Rondon, Bot. 2, Bot. 48, pl. 6. 1914, syn. nov. TYPE: Brazil. Mato Grosso: Serra do Tapirapoan, Jan. 1914, *F. C. Hoehne 5638* (holotype, R).

Notes. Moricand (1844: 131) described the species *Zornia virgata*, noting "Hab. in Brasilia e Gardnerianis sed (schedulá deperdita) locus natalis incertus." Gardner's unique type is deposited at G. However, Mohlenbrock (1961) erroneously cited the collection *Martius 1116* as the type for *Z. virgata*, which was the only material examined by Bentham (1859) and lacked type status.

Hoehne (1914) established a new variety for *Zornia virgata*, justifying that this differed from the typical variety by having more translucent dots in the bracteoles. However, our detailed study revealed that this characteristic occurs throughout the species, varying only in the number of glands. The type material has been located in the herbarium at R, and through the analyses of the type material and the description it is possible to verify that this variety is in fact *Z. virgata*. The variation observed in this study in *Z. virgata* does not justify the maintenance of the variety *major*, and it is therefore synonymized here.

New Combination

15. Zornia vichadana (Killip ex Mohlenbr.) Fort.-Perez & A. M. G. Azevedo, comb. et stat. nov. Basionym: *Zornia pardina* Mohlenbr. var. *vichadana* Killip ex Mohlenbr., Webbia 16(1): 87. 1961. TYPE: Colombia. El Vichada, 1 May 1939, *O. Haught 2797* (holotype, US).

Notes. Mohlenbrock (1961) established *Zornia pardina* var. *vichadana* based on material of *Z. diphylla* var. *vichadana* Killip, which was not validly published, being an in sched. name (nom. nud.). This variety is elevated to species level here because it possesses characteristics that support it as a well-defined species, such as the lack of auricles at the bracteoles and the absence of a vinaceous pigment in the bracteoles and leaflets.

Mohlenbrock (1961) also established *Zornia pardina* var. *crinita* Mohlenbr., but Vanni (1981)

elevated this variety to *Z. crinita* (Mohlenbr.) Vanni. *Zornia vichadana* is characterized by the presence of lanceolate bracteoles and the absence of auricles at the bracteoles, while *Z. pardina* and *Z. crinita* present oval to lanceolate bracteoles with auricles at the bracteoles.

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